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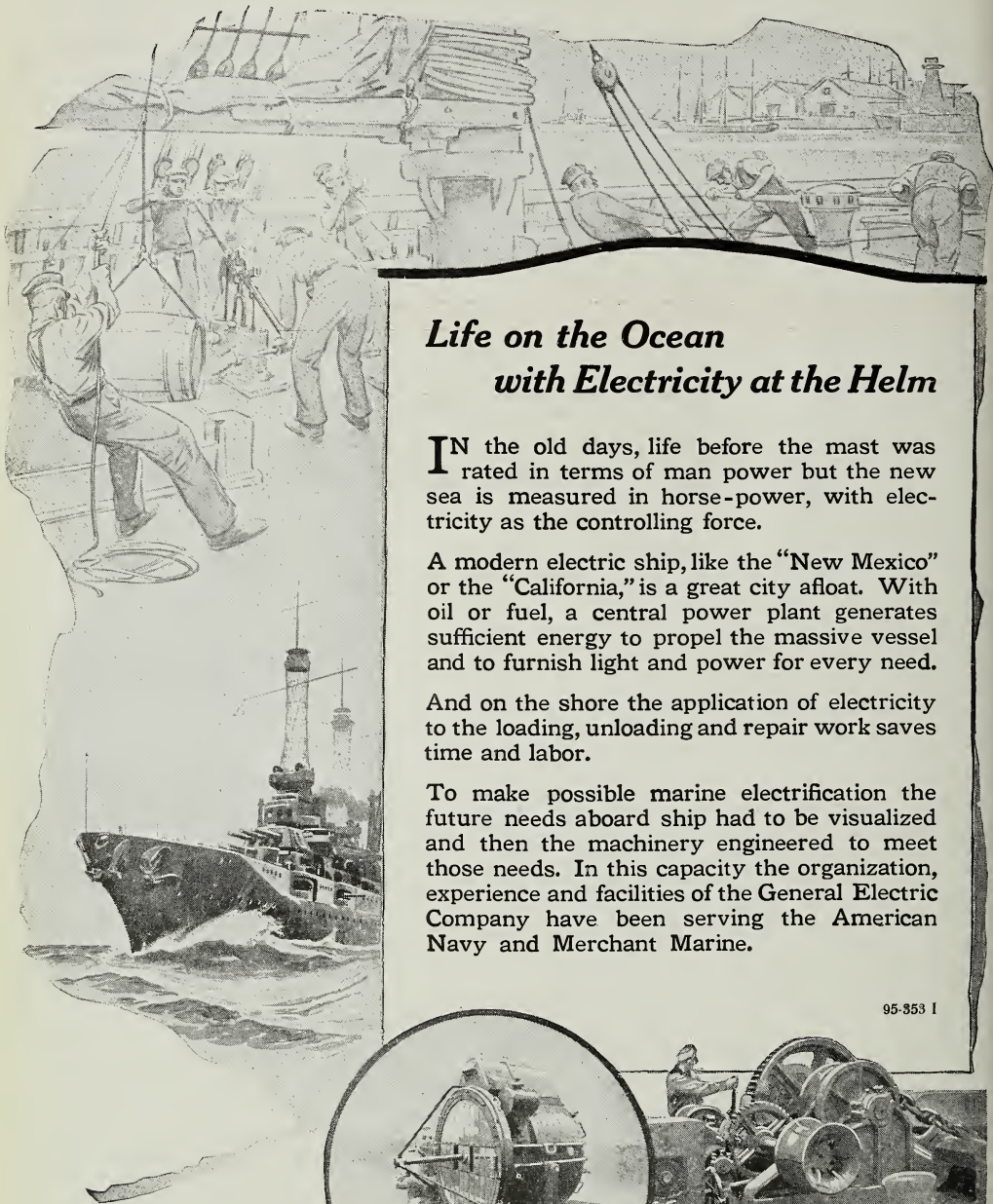
The Agricultural Student



November, 1920

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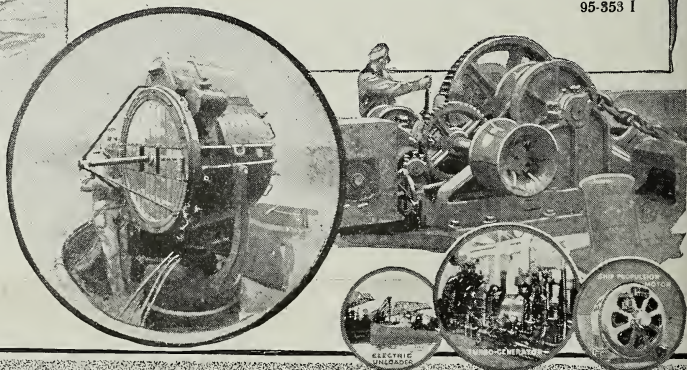
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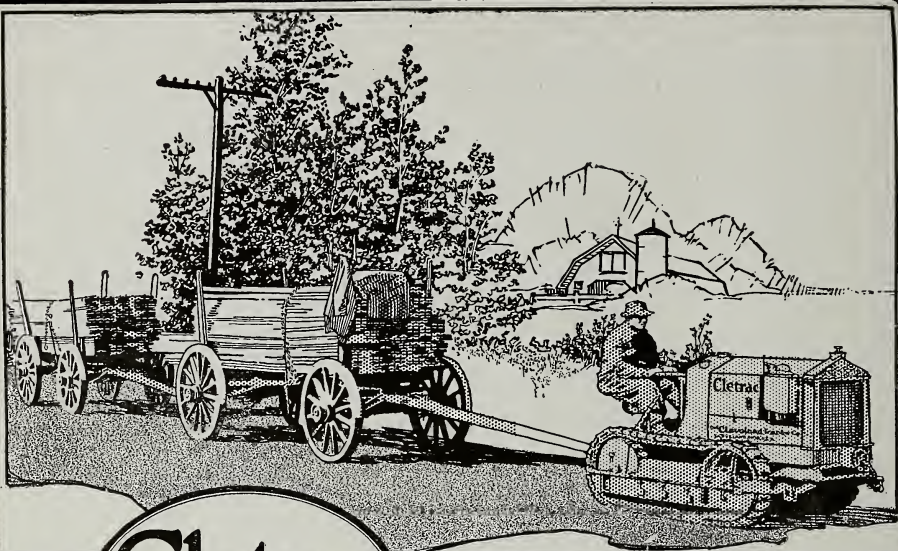


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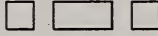


HARD THIS
WAY BUT—

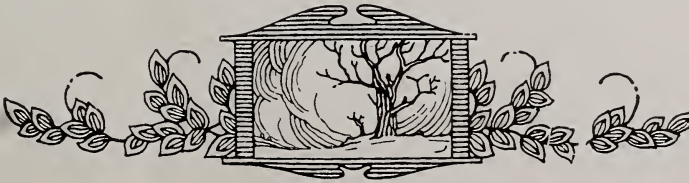


EASY ON A TRACK
THE CLETRAC WAY

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The Agricultural Student

VOL. XXVII

OHIO STATE UNIVERSITY, COLUMBUS, OHIO, NOVEMBER, 1920

No.

SOME PROBLEMS OF THE SOUTHERN PORK PRODUCER

By D. W. WILLIAMS, Professor of Animal Husbandry, A. & M. College of Texas.

NOT long ago when talking with a Georgia farmer he asked me the old question, "What is the best breed of hogs?" I gave him the usual answer to which he replied, "That shows you don't know much about it. The 'Curly' Poland China is the best breed. Why I have some of those and I can make them weigh 125 to 150 pounds in a year and I should like to see the other hog that can be made to do that. Remember tho it is the curly kind and not the smooth haired ones." In South Carolina a farmer whose hogs ran wild in the swamps told me that he never marketed them before they were four years old. A candidate for a county agency in Texas, when asked at what age should a farmer be able to market 200 pound hogs, replied, "Oh, from one and a half to two years of age if he pushes them and, of course, we all know that it pays to push hogs along always." Needless to say, he is still a "candidate," and I am still wondering how long it would have taken if he hadn't advised "pushing" them.

I do not want to make the impression that the above cases are at all typical. On the other hand, they are exceptional instances of tendencies that are very general. Most of the farmers in the south at present are fairly well informed as to methods of raising hogs. There is much confusion, however, as to relative merits of breeds and it takes the average southern farmer too long to get his hogs to a marketable weight. It is

the opinion of the writer that there should be a more general study of live stock conditions made between the various states instead of the present tendency to confine ourselves to more or less local problems. There is a good field for the graduating animal husbandry student from northern colleges in any of the southern states, and more of them are coming south every year. With the hope that some of the problems of the southern farmer, who tries to market a few hogs each year, will be interesting, I am going to briefly mention a few of them.

To try and produce hogs in the cotton belt, using the same methods as are used in the corn belt, is impossible. This leads to our greatest single problem and that is the production of a satisfactory carcass, using the feeds which we have most readily available. In many sections peanuts do well where corn makes only a very small yield. In others rice by-products are the cheapest feeds available. Soy beans come in for their share of discussion and in some sections hogs must depend on mast to put them on the market. All of these feeds produce carcasses that are soft or oily, some of the carcasses will show a very dark fat that will drip continuously even in the coolers. For soft carcasses the farmer must take from two to five cents per pound under the market. This amounts to millions of dollars annually. A great deal of experimental work has been and is being done to solve this

soft pork problem. In the past the various states have worked more or less independently, but during the last year the animal husbandry division of the Bureau of Animal Industry has taken up the problem jointly with the several states and much good cooperative work is now being done.

Finding a way so that cottonseed meal can be safely fed to hogs a considerable period of time has been a very puzzling problem. So far the solution has not been found. Cottonseed meal fed with corn is one of the best hardening rations that can be used, still the combination cannot be fed for over about four weeks where much of the meal is used. The placing of fish meal on the market has helped some in bringing down the cost of protein concentrates, but still we could use cottonseed meal to advantage if the results were not apt to be fatal.

Marketing is a major problem. In many cases the distance to one of the large markets is so great that freight, loss, and shrinkage is apt to be heavy. As a result, there are quite a number of small packing plants scattered through the various states. At these plants as a usual thing the price is, of course, based on Chicago but there is no competition on the market and they are very easily glutted. In some cases, prices are paid on a soft basis, and if the hogs kill hard then two cents per pound is added. In other cases a hard hog price is paid and the deduction is made if they kill soft. The price received, however, is never quite the price that the corn belt hog producer receives, running from one to two cents at least under Chicago. Country speculators are very few but where they are found they always work on a much wider margin than does the "stock-buyer" that is found in every commu-

nity in the north. The solution has been cooperative shipping associations which are usually organized by the county agents. Still, I have seen hogs purchased from farmers for ten and eleven cents when the market was from fifteen to seventeen cents.

The south is blessed with a very great number of pastures and forage crops and in order to produce pork most economically we must use these to the fullest extent. Some kind of forage is available every month in the year. Farmers incline to one of two extremes in the forage line. Either they depend entirely on forage or they keep their hogs penned up in a tight enclosure. The first practice means that it takes too long to grow the hog and the second that it costs too much. The most common grasses and forages used are bermuda grass, burr clover, crimson clover, alfalfa, lespedza, rescue grass, carpet grass, rape, rye, oats, barley, sudan, vetch, sorghum, sweet potatoes, soy beans, velvet beans, and peanuts. There is much yet to learn about the adaptability and value of these, and many others, as hog feeds.

A few years ago the average hog in the south was of poor quality and so far as blood was concerned was largely razor back. Improvement has been very marked and the change has been brought about in a very short time. Troubles, however, have been always present. One of the real difficulties has been that northern breeders have very generally practiced sending hogs south that they couldn't dispose of as breeding animals at home. It is my opinion that Poland China breeders are less guilty along this line than are the others. This is due largely to the fact that Mr. McFadden, secretary of the American Poland China Record, per-

(Continued on page 138.)

RED CLOVER

By GEO. L. SCHUSTER, '16, Professor of Agronomy, Delaware Agricultural Experiment Station.

The old adage, grow more clover to raise more corn to feed more hogs to make more manure to grow more clover, should be revived. Statistics show that the average rotation consists of about nineteen years of non-legumes to one year of legumes. Occasionally a farmer is found growing clover regularly every third or fourth year. Some practice a corn, soybeans, wheat and clover rotation, thus having a legume every second year. But on entirely too many farms there are no fields of legumes to be seen at all. The growing of clover on somewhere near a fourth of the tillable land is absolutely essential if the fertility of the soil is to be maintained. Men that have failed to grow clover systematically on their farms have paid dearly for the failure in constantly decreasing crop yields.

SOIL IMPROVER.

Red clover is a great soil improver. The central root has been known to extend into the ground some six or seven feet. The average depth of penetration is two to four feet. The secondary roots are numerous and usually arise from the upper third of the tap root and occupy 6 to 8 inches of the surface soil. This root system adds organic matter to the soil. It serves as a soil pulverizer and moisture retainer. To the clay like soil this means that it will be more friable; to the sand soil it means that its water holding capacity will be increased. A typical corn soil contains 101,000 pounds of organic matter in the surface 6 2-3 inches. Continuous cropping reduces the organic matter as shown by ten years work at Minn. Station.

<i>Crop grown continuously</i>	<i>Pounds organic matter per acre.</i>	<i>Plow depth.</i>	
	1895	1905	Loss
Wheat	104,200	93,500	11,000
Corn	101,100	82,500	18,600
Potatoes	100,800	78,100	22,700

When compared with a crop rotation:

Wheat, clover,			Gain
timothy -	92,200	97,700	5,500
Wheat clover			
(second crop			
plowed un-			
der)	96,300	114,900	28,700

Not only is the physical condition of the soil improved but there is added to the soil fertilizing constituents. The experiment station at Delaware found that the stubble and roots from an acre of red clover yielded—

33 Pounds of Nitrogen.

10 Pounds of Phosphoric acid.

10 Pounds of Potash.

The tops of red clover yielded per acre—

70 Pounds of Nitrogen.

19 Pounds of Phosphoric acid.

46 Pounds of Potash.

The analysis of the roots and tops were made after the plants had grown about four months.

A ton of mixed barnyard manure contains—

10 Pounds of Nitrogen.

6 Pounds of Phosphoric acid.

13 Pounds of Potash.

If the clover is plowed under there would be added to the soil—

103 Pounds of Nitrogen per acre.

20 Pounds of Phos. acid per acre.

56 Pounds of Potash.

On this basis it would take 9 or 10 tons of barnyard manure per acre to replace the clover.

Besides this fertilizer value, red clover has the ability, as has any other legume, to extract nitrogen from the air and fix it in the soil to be used as plant food. Nine years work at the Canadian Field Experiments with clover gave a gain of 472 pounds of nitrogen or an average gain of 52 pounds each year by fixation, which was added to the soil and was in addition to what was in the roots and tops.

If red clover is fed as hay to live stock and the manure saved and returned to the land you will return:

35 Pounds Nitrogen.

9 Pounds Phos. acid.

27 Pounds Potash,

for every ton of hay fed.

Timothy when fed as hay will return in manure:

14 Pounds Nitrogen,

5 Pounds Phos. acid,

21 Pounds Potash.

FEEDING VALUE.

Below, red clover is compared with some of the leading roughages for feed. Timothy and wheat bran are included.

Feeding Stuff	Digestible nutrients in 100 pounds.		
	Protein	Carbo- hydrates	Fats
Red Clover	7.6	39.3	1.8
Soy Beans	11.7	39.2	1.2
Alfalfa	10.6	39.0	0.9
Timothy	2.4	39.0	1.4
Wheat Bran	12.5	41.6	3.0

Red clover as a hay doesn't surpass alfalfa or soy beans but alfalfa and soy beans are crops suitable to one man's farming while red clover will suit ten.

For the cow, clover hay is one of the best of all roughages. It furnishes large amounts of crude protein so essential to milk production and is palatable and much relished. Clover hay is usually rich in lime which is also needed. Where well cured clover hay furnishes one-half or more of the roughage the dairyman is able to cut down the allowance of concentrates and reduce the cost of the ration. For sheep, calves and young stock it is all important. Chaffed clover hay in slop is fine for hogs, especially breeding stock.

By adding clover hay to the ration of a steer to be fattened, the grain requirements can be reduced and the fattening period shortened. Instances have been reported where farm horses and driving horses can be successfully kept using clover hay as roughage.

Clover pasture is helpful and important for all farm animals. It about maintains pigs, so that all the grain fed goes to make gain. Pigs on clover are healthy and have good bone and constitution—points of special importance in breeding stock. Cattle and sheep should not be turned in clover for the first time while hungry or while the dew is on.

COMING IN AN EARLY ISSUE

Project for Country Life Betterment.....	By Edith Lathrop
Teacherages on the Cooperative Plan.....	By A. O. Neal
Farmyard Sanitation	By Vance Clever
Value of Vocational Home Economics	By Clarice Chamberlain

Now compare red clover as a soiling and pasture crop with others that may be used.

Feeding Stuff	Digestible nutrients in 100 pounds.		
	Protein	Carbo- hydrates	Fats
Alfalfa	3.3	10.4	0.4
Red Clover	2.7	13.0	0.6
Clover and Mixed Grass	2.2	14.1	0.6
Alsike Clover	2.7	11.8	0.4
Timothy	1.5	19.3	0.6
Blue Grass	2.3	14.8	0.6

Clover is particularly good for cutting and feeding green. It ranks next to alfalfa as a soiling crop. By cutting

clover early, it at once starts growth again if the weather is favorable and will furnish three or four cuttings annually.

Red Clover as a soil and live stock builder is hard to beat. It hasn't been the author's purpose to discourage the growing of other legumes. We need them all. There is plenty of room for them, but Red Clover needs encouragement. It is the only crop in the ordinary rotation that has any special merit as a soil improver. As a roughage it is difficult to surpass. The manure produced from feeding Red Clover has a distinctly high value. It is worth our best efforts.

THE DEVELOPMENT OF SOIL SCIENCE

W. E. KEYSER.

The History of Agriculture begins with the history of man. Man in his primitive stage of antiquity, described it as being of divine origin. The earliest writings are found in the Egyptian Pyramidal records. The Egyptians tilled the valley of the inundating Nile, but it was not of any scientific nature. According to the Grecian, Roman and Biblical history, the common welfare lived under what is known as a Pastoral Stage where the crops were raised on a patch of ground until exhausted, then it was abandoned for a new spot of ground, and allowed to grow wild. Cato attempted to describe the care of a farm but this was on more of an Economics basis.

The early observations of plant growth were more or less speculative. There was no experimental evidence to affirm the assertions that were made from time to time. Thus, the early writings are of no scientific value even though they are quite interesting.

Aristotle, who lived in the fourth century B. C. classified matter into four elements, namely: earth, air, water, and fire. And he was not considered to be a fool by any means, even though today, there are 83 elements and not any one of Aristotles' appear on the list.

The first recorded experiment, was conducted by Jean Von Helmont of Brussels, in the beginning of the 17th century, in an attempt to determine the source of material of which the plant is composed. He planted a 5 pound willow tree in 200 pounds of over dried soil. Nothing more than rain water was added to keep it in a moist condition and to prevent any dust particles from entering, the soil was covered with perforated sheet iron. At the end of five years the tree weighed 169 pounds and 3 ounces. The soil was dried again and was found to weigh within 2 ounces of what it formerly did. The fallen leaves were not weighed.

Helmont concluded that the 164 pounds of plant arose from the water.

Later, Bradley in his treatise of Gardening argued that as water could be distilled and evaporated and a willow tree could not, hence water was not the plant food. He contended that the air was the plant food.

Just about this time (1725) England was undergoing an industrial reformation where slavery and serfdom in the agricultural districts were giving away to land tenancy. The tiller of the soil began to use initiative rather than merely being a cog in a wheel in his work. A young man Jethro Tull who had graduated from Oxford and being interested in agricultural work divided tillage into horse and hand hoeing. Being more interested in deep tillage, he wrote the first agricultural book entitled "Horse Hoeing Husbandry." He believed that neither water nor air was the source of plant food; that the manner in which the elements aided plant growth was as follows: niter divides and prepares the food for the plant in the same manner as a knife cuts and divides his meat as food, and if niter is put directly on the roots, it will kill them just as surely as a knife misapplied would kill a man. Water in Helmont's experiment was thought by some great philosophers to be it (plant food). They were deceived for in the intervals of the water there are charges of earth which no art can free from it. Air could be no part of the plant, for it has no specific gravity more than the incumbent atmosphere, therefore it could not be of any weight to it. Though no plant could live without heat altogether, different degrees of it are required by various plants. Earth is that which nourishes and augments

a plant. It is the true food. Every plant is earth, and to grow and increase it, more earth must be added to it. Too much niter corrodes the plant; too much water drowns it; too much heat (fire) burns it; too much air dries the roots; and too much earth a plant never has, unless it is completely buried in it.

The earth particles are taken up by the fixed lactuals of the roots therefore the particles must be pulverized to a size like dust on a looking glass to be of any use to the plant. The plant does not have this power so Tull advocated the fine cultivation of soil. Hence the invention of his many tilling implements. Tull never observed any experiments as they are conducted today. Had he studied the plot systems, such as we have at the Wooster Experimental Station and compared "check" plots with directly adjacent plots (both no doubt receiving the same amount of pulverizing in cultivation) he would have concluded that after all the food of plants was not fine earth particles.

The field for the scientific investigation of the food of plants was now beginning to open. In search of a certain substance termed "phlogiston," chemists as Priestly, Scheele, Cavendish and Black discovered gases which are today known as oxygen, hydrogen, nitrogen and carbon dioxide. These elements are the most essential constituents of plant tissue but these men being so prejudiced by the phlogiston theory, never realized the importance of their discoveries. This theory was advanced by Stahl, a German chemist, in which he states that plant tissue contained some mysterious substance which escaped during combustion. Thus coal was nearly pure phlogiston.

In 1784, Arthur Young an Englishman, published "Annals of Agriculture" which contained discussions concerning previous developments in the science of Agriculture. He experimented with fertilizers as a means of plant food. Some plot treatments were as follows:

Pot Substance added	Yield grains
1—Train oil	0
2—Spirit of wine	0
4—Poultry dung	87
6—Gunpowder	0
8—Pitch	0
10—Charcoal 2 oz.	3
12—Oyster shell	11
15—Flour of brimstone	0

Pot Substance added	Grains
18—Charcoal ashes	110
19—Salt of tarter	0
22—Common salt	12
24—Turpentine	0
25—Tallow	4
26—Human faeces and charcoal...	185
28—Rich new loam	48
30—Rich loam and charcoal	220

The conclusion of these experiments is that actual experiment was just in its beginning. Young used substances which we today know would be of no avail; nevertheless some one had to find this out.

In 1783 Senebier of Switzerland discovered that the source of carbon was from the carbon dioxide in the air. If Helmont had known this, he could have accounted for some of the weight in the willow tree. Also about this same time De Saussure discovered that plant ash was derived from the soil.

By 1840 the works of Laws and Gilbert of England and Liebig of Ger-

many were begun, which were the foundation of modern Soil Science. Laws and Gilbert founded the Rothamsted Experimental Station in England which is the greatest station of its kind in the world today. The Broadbalk field is known the world over for the wheat experiments that have been conducted on it continuously for 76 years. The number of sample bottles of soil plant and ash procured is about 41,000. Liebig is better known as the "Father of Agricultural Chemistry." Some of his methods in laboratory research are still in use. He devoted much time toward the proof of his theory that the ammonia of the air is the source of nitrogen for plants, but in this he failed due to the weakness of drawing quantitative deductions and specific conclusions from qualitative data and general observations. Laws experimental work was taken from the field while that of Liebig's was taken in the laboratory. The result was the chemical analysis of the plant as well as that of the soil.

When it was realized that a chemist could analyze a crop and ascertain the elements of which it was composed and then analyze the soil and determine the proportion of the elements it contained, then the secret of successful soil fertility was solved for all time and eternity. Then arose the day for the artificial commercial fertilizers. We still have all kinds of grades and mechanical mixtures of fertilizers. But other factors have now crept in, which have brought us to realize that analysis alone is not final. For instance, as recently as 1886 Hellriegel of Germany discovered that nitrogen fixation was due to the root tubercle bacteria of legumes. Still another factor is that

(Continued on page 140)

ANIMAL HUSBANDRY

J. GLENN BATES, Editor; G. J. SCHMIDT, S. C. POWERS, E. L. HAWK, Assistants.

SHEEP TICKS

In spite of the efforts of the United States Bureau of Animal Industry to make sheep raisers realize the losses caused by ticks, comparatively little attention is paid to the subject of tick eradication.

A great many thousand dollars would be saved yearly by sheep raisers if they would read and follow the instructions contained in Farmers' Bulletin No. 798.

It is estimated that the average annual loss caused by sheep ticks is from 20 to 25 cents per head and this does not take into consideration, deaths due to the lowered vitality of sheep attacked by ticks.

It seems a shame that this annual loss should not be checked when the method of preventing it is so simple and inexpensive. The creosote solution recommended by the bulletin costs but two or three cents per application per head, whereas the dipping itself takes but the fraction of a minute for each animal treated. It seems strange that a sheep raiser should not be willing to spend a minute's time and two cents in money to save himself the loss of 20 to 25 cents yearly on every head of sheep he owns.

HOME-MADE MIXTURES KILL LICE ON POULTRY

A satisfactory home-made mixture to kill lice on poultry consists of three parts gasoline and one part of crude carbolic acid with as much plaster of Paris as the liquids will moisten.

The material is allowed to dry a few hours and then placed in air tight con-

tainers. The mixture has been tried out at the Ohio Experiment Station.

The powder should not be mixed nor placed near a flame. It is necessary to hold the fowl while dusting in order to work the dust into the feathers thoroughly. Ten pounds of the mixture will treat 250 mature birds.

Mercurial ointment or "blue butter" has been found valuable for killing head lice frequently found on little chicks. Mercurial ointment is a stiff substance and should be mixed with one or two parts vaseline to apply it easily.

A bit of the mixture the size of a pea applied with the tip of the finger and rubbed into the feathers about the head will destroy the lice. It should not be used too freely.

RIGHT WAY TO BUY STALLIONS

This is the season when stallion salesmen are opening their selling campaigns. Prospective stallion buyers should remember that the poorest horse requires the hardest selling. A good horse sells himself to any one who knows. When it becomes necessary to practice the selling methods that include a slick salesman who spends his money freely in an effort to induce twelve men to invest two hundred dollars each in a stallion that would not make a high class market gelding, it is time for prospective buyers "to lay off." The present prosperity of the farmer calls forth more than usual activity on the part of promoters; and a company stallion is a good selling proposition.

When a stallion is needed in a com-

munity, adopt the company-buying plan. Let the men interested organize themselves and delegate competent members to go to the stallion dealers and make their own selection. They would not only have the barn full of stallions from which to pick, but they would also save at least the amount of the salesman's time and the various items of his expense account, which may total several hundred dollars.

Only such stallions as have proved their worth as sires or, by their breeding and individuality, give promise of becoming good sires, should be bought at any price—Carl W. Gay, head of Animal Industry Department, Ohio State University.

FATTENING LAMBS ON FORAGE

Lambs must be accustomed gradually to rich green feed like rape, soybeans, or cowpeas. The method commonly used is to put the lambs on a comparatively dry timothy or blue grass pasture upon arrival at the farm. Here they are allowed to rest and fill up on grass for a couple of days. An abundance of good clean drinking water should be provided at all times. After a day or two the lambs are turned into the corn field for about an hour, following their morning fill of grass. They are then returned to the bluegrass or timothy pasture. This operation is repeated for three or four days, and the time the lambs are allowed in the corn field is increased about an hour each day.

It is not easy to drive a load or two of lambs out of a large corn field, and there is always the danger of leaving behind a few which have strayed from the main flock. To avoid this trouble, fence off "sheep tight" a plot of two or three acres. In this plot grow forage to be used to gradually accustom

the lambs to their regular forage in the larger field. This plan will be found very convenient.

FALLING DOWN

By William F. Kirk.

Pity the man who never fell down

On his way to the distant goal—

The man who knows not the chilling
frown

They turn on the luckless soul—

Some men there be who from birth to
end

Have traveled the path of glory,

But the men who never fell down, my
friend,

Knows little of Life's true story!

All men are brothers to him who wins,

As maids would be mothers or lovers,
And all will bow to the hero's brow

Where the halo of greatness hovers.

But falsehood hedges him all about,

And the cheer makes way for the
cross.

The man who loses and then wins out

Can tell the gold from the dross!

Pity the man who never fell down

In the race we run to the end!

The brave heart drums when Misfor-
tune comes,

Man's bitter but faithful friend.

All would strive for the distant throne,

None sigh for Adversity's crown;

But Life has a richness never known

By the men who never fell down!

I speak the Truth, not so much as I
would, but as much as I dare; and dare
a little more as I grow older.—*The Fra.*

Is This the Final Honor?

Very appropriately, the final state
to ratify the Susan B. Anthony amend-
ment may be spoken of as a perfect
thirty-six.

AGRICULTURAL ENGINEERING

G. W. TIMMONS, Editor; F. R. BROOKMEYER, Assistant.

A LABOR SAVER IN SILO FILLING

One of the novel farm machinery exhibits at the Ohio State Fair this year which drew quite a bit of interest was an outfit for harvesting corn and cutting it into ensilage in one operation in the field; the prepared ensilage being hauled from the field in box wagons and blown into the silo. The harvester consists of a corn binder—minus the binding attachment—with an ensilage cutter of the knife-on-fan type attached. The cutter is small and the fan is light since the cut stover is only to be blown to the height of a wagon box which is driven along side the harvester. All mechanism of the harvester-cutter combined is driven by a light four cylinder motor mounted on the frame of the machine. The machine itself is drawn by three horses. At the silo a small fan driven by a low powered engine elevates the prepared ensilage into the silo.

The saving of labor by this new method of silo filling is readily apparent, and when owned cooperatively by neighboring farmers the outfit is entirely practical.

GOOD ROADS

"Transportation has made every avenue of civilization. Human progress is reflected in the economic welfare of the people of highest civilization and there is no advancement in production and exchange until there are highways to facilitate the transportation involved. We shall notably enhance the advantages of American production when we add to the convenience of transportation through the construction of highways suited to the use of the modern

motor vehicle. It is the one agency of putting every community in the Republic on the map of commercial relationship."—*Warren G. Harding.*

"The establishment and maintenance of a Good Roads System throughout the country is as essential to the life of the nation as proper circulation of the blood is essential to the life of the individual. With a perfect open highway system there can be no stagnation of transportation at any time. Normal needs properly met will prevent emergencies."—*James M. Cox.*

"The failure of the railroads to keep pace with the growth of the country has developed a transportation problem which seriously menaces our economic development and prosperity. It will be many years before the railroads can be brought up to the required standard. Meanwhile, our best chance of immediate relief is a great system of state highways so laid out and constructed as to supply through the automobile and motor truck the additional transportation facilities the country imperatively needs. I strongly favor the construction of good roads everywhere through both state and national aid. After we build them we must maintain them by an intelligent system of superintendence."—*William G. McAdoo.*

HOW FAST SHALL I PLOW?

With the advent of the farm tractor, which offers as many different speeds of operation as there are types, the problem has arisen as to what is the proper speed of plowing in order to obtain the lowest draft and the best pulverization.

It is a generally accepted fact that the type of mouldboard has a direct relation to this "ideal speed" or "optimum speed" as it will be hereafter called.

During the last term three students in the Department of Agricultural Engineering here endeavored to run a series of field experiments which would give some conclusive information on the question of the speed of plowing. Their manipulation proved very successful and the conclusions they brought out are to be highly recommended. The following is a digest of the report submitted by these three men:

Aim—to determine, at different depths, the relative draft per square inch of furrow at varying speeds.

In an attempt to gain knowledge of the influence of speed on draw bar of a plow several experiments have been attempted by both professionals and amateurs alike. The opportunity was offered us, as students, to use the excellent equipment of the department in investigating the problem under farming conditions as they are found here on the University Farm.

Equipment—Our prime mover was a comparatively new tractor rated at 15 H. P. on the drawbar and judged capable to give the necessary increments of speed. Its performance was entirely satisfactory, adapting itself to hitch and work with one wheel in the furrow in a manner giving ideal conditions in this respect. Fuel used was gasoline entirely.

The plow used was an Oliver No. 78, engine gang, automatic lift, 2 bottom with mouldboards bearing the description "N. C. 141, Q. D. 14." It was equipped with a combination coulter and jointer throughout tests. The plow was in fair condition of wear and use. The dynamometer was the best of its type.

The soil was a clay silt loam, alluvial

deposit, finest bottom and was flooded during the high water this last spring. The crop previous was alfalfa. Roots were not very thick but gave some resistance and could be classed as alfalfa sod. Conditions were ideal, giving good traction and pulverization.

In preparation the operators thoroughly acquainted themselves with the outfit and did much preliminary plowing to adjust all parts of both tractor and plows. Preparations were made to keep accurate record of the area of the furrow slice in cross-section at all times through the test.

The report continues: "Final preparations being complete, the tests were begun Monday, May 17, and all completed the same day. This gave absolutely the same conditions of soil moisture and effect of weather and the part of the field used had nearly all the same quality of soil. Some slight errors were observed due to contour and some other uncontrollable factors. Operators were stationed: two men to the measurements of furrow slice and depths, one man on tractor and plow with Prof. McCune operating the dynamometer and in direct charge of the tests.

The conclusions drawn from the results of the tests were tabulated thus:

1. That for a mouldboard of a given design there is an optimum speed; at which speed will be combined the best degree of pulverization and meet efficient pull per square inch of furrow slice.

2. That the optimum speed will vary with the depth of plowing, being more at shallow depths and less at greater depths.

3. That the optimum speed for this particular mouldboard lies between 175 and 275 feet per minute or approximately $2\frac{1}{2}$ mile per hour.

4. That with an increase of speed

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HOME ECONOMICS

DAISY CHLOE CUNNINGHAM, Editor.

A. FAYETTA S. KENDALL, Assistant.

ANOTHER EXTENSION TOUR

How to make the farm home as attractive as the city home as far as conveniences are concerned was demonstrated by the agricultural extension department of Ohio State University during the first two weeks in October. The department, cooperating with the Erie railroad, sent teachers over the Erie system in Ohio to demonstrate the use of electrical appliances for the farm home, water supply systems, septic tanks, etc. Stops were made at county seats and other towns along the line, except the branch between Urbana and Cincinnati. There were four coaches in the train.

In order to relieve congestion during farmers' week and to give greater attention to the farm youngsters, who attend it, the annual meeting of winners in boys' and girls' clubs contests will be held at the university this year, Nov. 15-19, instead of in January and February.

❖❖❖ HINTS ❖❖❖

Copper kettles or other utensils that have been dulled or blackened by contact with the fire are easily cleaned with a lemon cut in half, dipped in salt, and rubbed over the surface of the metal, which must, however, be speedily rinsed with water to prevent the acid from eating into it.

When washing blankets, use plenty of soft water and soap that has no resin in it. Resin hardens the fibers of woolen goods and should never be used. The

water in which they are scalded should be made quite blue with indigo. Wash only on a bright breezy day, so that they will dry quickly.

To whiten steps, put one pound of glue in three pints of water and when quite dissolved pour into a tin or jar. Add powdered whiting till the mixture is as thick as paint. Wash the steps and then apply the mixture with a stiff brush. This will give the steps a white clean appearance that will last a long time.

When lamps smoke, remove the wicks from the burners and boil the burners for half a day in a solution of half a teacupful of baking soda to a quart of water. Use an old kettle as it will injure a good one. After boiling for at least four hours, rinse thoroughly in clear water, dry perfectly, put in new wicks, and the lamps will burn clear and bright. Never throw away the burners unless they are broken. This treatment cleans out all tubes and makes them like new.

Fresh bread is so moist that it makes a good growing place for mold. Therefore, scald the bread box at least once a week and do not shut it up air-tight in hot weather or when filled with fresh bread.

To make smelling salts, procure an ounce of rock volatile and break it into small pieces. Put it into the bottle and then cover it with eau de cologne. Let it stand for a few days and it is ready for use.

Lace that is desired to have an "old lace" shade will soon do so if after washing it is dipped in the water potatoes have been boiled in; care must be taken not to get this too stiff.

To banish ants from the house and kill those that remain, there is no better way than the old one of brushing thoroughly all the cracks and crevices infested by the insects with a hot solution of alum and water. Two parts of alum should be dissolved in three quarts of water and allowed to stand until alum is dissolved. It should be boiling hot while it is being used. All household insects disappear before this simple treatment.

SANITATION AND HYGIENE IN THE HOME

"Sanitation"—I wonder just what impression the word makes upon the mind of the average person. There are not a few who are reminded of the "ultra domesticated find" the housekeeper who runs for a dust cloth to dust off your chair when you step in for two teaspoons of baking powder and who is no less fleet in running for it to remove the dust you have left when you are gone.

Probably it is just this mental picture which causes many people to take an attitude of indifference or even of ridicule toward this subject. To the person who knows, the housekeeper, in whose house every brass knob reflects her own image is no more commendable than the one in whose house they are dulled by the touch of many fingers.

I do not mean to convey the idea that the shining door-knob does not mean anything for, as has been well said, "the beauty of the house is order, the blessing of the house is contentment."

However it is true that sanitary housekeeping, as understood in the new sense, must not be sacrificed for the shining door knob type.

It has been the popular idea, almost since there has been any notice taken of the effect of cleanliness on health, that the kind of cleanliness meant was that of the surroundings of the individual. A very great change in this idea has taken place, and by means of public schools and colleges, is slowly permeating the popular mind. To quote H. Winslow Hill, author of "The New Public Health," "The old public health was concerned with the environment; the new is concerned with the individual." The old sought the sources of infectious disease in the surroundings of man; the new finds them in man himself." When we realize that sanitation is one important phase of public health and hygiene another, we understand that the two phases are of vital concern to each of us. The observing person knows that infectious diseases are being controlled much more efficiently today than they were ten years ago. It is because the sources of infection are not sought in this environmental state alone but among those "infective" persons whose excretions or other body constituents or body contents enter the bodies of other persons. Disease germs are not generated as the popular opinion seems to have been, but, for water to be infected with typhoid germs, those germs must have come from some individual suffering with typhoid. Since we know this to be true, we have a definite point from which to start the fight against infectious diseases.

Society would almost rebel at the thought that the women of our land,

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THE CAMPUS ECHO

H. W. HAIRSHFIELD, Editor; MERRILL CONN, HOWARD JOHNSON, A. W. WOODROW,
Assistants.

THE HORTICULTURAL FESTIVAL

Beginning with the new year, the Horticultural Society has before it, a task bigger and greater than ever attempted in previous years. Last spring it was decided to combine the Second Annual **Chrysanthemum** Show and the Annual Apple Show together with the Vegetable and Landscape Gardening exhibits and have one big show. This festival will be held probably during the second week in November when the chrysanthemums in the greenhouse, of which there are about 65 varieties, will be attired in all their gorgeous bloom.

Under the capable leadership of George E. Trisler, who was appointed chairman of the Horticultural Festival, the following committee chairmen have been named:

A. P. French, Secretary-Treasurer.

K. M. Allen, Pomology.

D. D. Stacey, Vegetable Gardening.

H. P. Mulford, Floriculture.

C. M. Jenkins, Landscape Architecture.

In addition to the above named exhibits there will be material dealing with insect pests and diseases and various other lines of the work. The Apple Pie Contest and Cider Booth will, no doubt, be as popular a drawing card as it was in olden days.

Great plans are being laid. Watch the Horticultural Society outdo itself!

RECORD GRANGE MEETING

The opening meeting of University grange on September 22, resulted in a

full house. The grange room, (206), at H and F. building, was crowded to the doors by Ags. when the program began. O. R. Keysey, master of University grange spoke of this organization as the only agricultural organization on our campus where the students and professors met on equal grounds. This grange which at one time was the largest in the state, now has a membership of 350. Degree work will begin in October when it is hoped that University Grange 1620 will again be one of the largest granges known.

The boys put on their ideal of a wedding. The little blushing bride of 6 feet 4 inches and the stalwart groom of 5 feet 2 inches are living very happy at this writing.

HOT TIME AT WARMER

As usual the Y. M.-Y. W. Warmer of October 1 was a grand success. The warmer affected the Y. M.'s chiefly as there were about ten of the Y. M.'s to each co-ed. The co-ed show has given Ziegfeld's Follies a back number. Let's have Warmers to conserve the fuel supply.

FRESHIES HAVE NERVOUS BREAK-DOWN

The nut-tests of September 24 were too much for the Fresh, especially before they took them. The yearlings, scared to death by the advice of the upper-classmen, braved the storm with faces white. They are now breathing

easier. The seniors fearing a little work of one hour, hunted several hours for some one to substitute as a nut for an hour. Everything from cigars to dates were offered.

NEW FACES IN AG. ALLEY

Because of the large number of students in the agricultural college there have been several additions to the teaching force. Professor Norman W. Scherer has returned to the department of horticulture. Miss June Finley, University of Chicago, and Miss Jeanette Butler, University of Wisconsin, are now with the home economics department. Joseph L. Gayle, University of Kentucky, who teaches agricultural chemistry; Francis L. Morrison of Kenton, an Ohio State University graduate, of the rural economics department; Clarence H. Kennedy of Cornell, in the entomology department, and Lewis H. Tiffany of the University of Chicago in the department of Botany are the other new members of the instructional force.

TOWNSHEND AG.

SOCIETY BOOMING

The Townshend Agricultural Society met in an open meeting with a record attendance. As has been the custom, addresses were given by some of the agricultural staff. Dean Vivian, and Professor Firman E. Bear, of the soils department, were secured to address the meeting. C. V. Kendall and J. J. Mattus of the Student staff gave the great possibilities of The Agricultural Student. Vance Clever, the president, gave the aims of Townshend Ag. and made a plea to the agricultural students to help attain them.

SADDLE AND SIRLOIN MEET

The Saddle and Sirloin society met on October 6 with Vice-president Condon in the chair. Professor Gay, the new head of the animal husbandry department, was the principal speaker. He gave his reasons for coming to Ohio, the pioneer state of the live-stock industry, and the state which still maintains the highest class of live stock.

Townshend Agricultural Society is becoming more attractive. The home economics girls are attending the society. The girls never go home alone after the meeting.

Have you made your plans for your fall sales. Be sure and aim where you can cover the most territory. Do not kick yourself for something you didn't do but that which you might have done.

If there was really a shortage of sugar, there was no shortage of excuses trying to explain it.

WORK ON BARNs

TO START IN SPRING

University officials have decided that work on five new buildings, among them the new hog and sheep barns, will be started next spring. Bids will be asked soon and decided upon early next year. The legislature has made appropriations totaling \$25,000 for the two barns. They will be located west of the river and south of the Lane avenue bridge. The animals will be moved from the cattle and horse barns to the new buildings and the old barns will be used for laboratory purposes.

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ACRES AND TRACTORS

By STANLEY H. WATSON.

THE first question that arises in the mind of the prospective tractor owner is "Will a tractor pay on my farm?," and in most cases "my farm" refers to the size of the farm. The common impression is that the number of acres in a farm determines almost entirely the question of purchasing a tractor, but a close study of the situation quickly develops the fact that the actual number of acres is a secondary factor in determining whether or not to add a tractor to the farm equipment. There are numerous other angles from which such a decision should be viewed. Some of these are, the character of the soil, the topography, the kind of crops grown, the farm labor situation, adaptability of the tractor and the rapidity with which the farm capital is turned over.

This last factor, capital turn-over, refers to the amount of income which shows on the farm books at the end of the year, and is not necessarily affected by the actual size of the farm, for we all know of the hundreds of farms of less than fifty acres which represent a heavy investment due to the fact that they produce highly specialized crops of truck, fruit, etc., which are worth, acre for acre, many times the amounts represented in farms running into hundreds of acres in size. So the first thing to consider is the size of our investment and the returns on this investment. The size of the farm is only one of the many factors which determine this answer. Taking into consideration the other factors, the farmer must decide how he can so mold existing circumstances, as represented by these factors, so as to create circumstances which will enable him to make best use

of the economical source of power which the tractor offers to him.

During the past few years, the increasing scarcity of farm labor has fortunately compelled the development and introduction of more and better machinery than ever before, and has also proved to the farmer that he can farm a reduced acreage with machinery replacing this labor and be better off than he was formerly. To meet this situation squarely, the farmer must first assure himself that he can assume the management of a farm which is operated by power: part of this assurance will be dictated by his own personal knowledge of gasoline motors, and his location near to a dealer in farm machinery who will give him quick, intelligent service when needed. The farm itself should be so adapted, or changed in layout as to eliminate wasteful turning, as mechanical power will do for agriculture what it has done for the manufacturing industries. Tractor owners realize that the tractor saves time, men and money—it gets results.

When power has become welded to the system of farming, production can be increased, and less and less dependence need be placed upon the variable factors of weather, health of animals and temper of the labor. The question of fertility maintenance may be easily disposed of by the assurance that the feed saved through reducing the number of horses can be diverted to more live stock and green manure can be sown and turned under with the tractor.

It is just as important to be careful to buy a tractor adapted for the farm as it is to adapt the farm to the tractor. Tractors were originally sought for the hard job of turning ground,

and, at one time, this was thought to be the limit of their usefulness. From this, their usefulness has been amazingly enlarged and today they are taking up every duty on the farm which calls for steady, sustained power, and for successful operation on the small farm, the tractor must necessarily be a machine readily adapted to many different jobs as small farms are usually worked in small units. Hence, a single year may be credited with a large number of days during which the tractor may be used, and the tractor must be an all year round machine capable of doing a large variety of work and to be used a large number of days, and this, perhaps more than anything else, will determine the value of the tractor to the farm, no matter what its acreage may be. Since there is a limit to the overhead charge which any business may safely carry, the tractor is not returning fair interest on the money invested in it until it is used enough working hours to guarantee this interest. At the peak load seasons of the year, in the spring and at harvest time, it often happens that two or three days' use of the tractor has determined whether or not the crop shall be a success or a failure, due to its ability to work around the clock without tiring, and many farmers, having found that the tractor of today is a standard, dependable piece of merchandise are really taking out their crop insurance in this way.

Does your acreage warrant the purchase of a tractor? Go deeper into the question and you will find out.

She (preparing to jump small brook)
—If I sprained my ankle how would you feel about it?

He—Oh, go on now. — *Wash Sun Dodger.*

PREPARE HOTBEDS AND FRAMES IN FALL

A coldframe is made like a hotbed, except that no manure is used. Enough heat is secured from the sun.

A coldframe is used to harden plants that have been grown in a hotbed, or to continue the growing of certain plants during the winter months. If you should take plants like the tomato directly from the hotbed and plant them in the open field they would probably die. They cannot stand the quick, great change from warm to cold conditions. If, however, such plants are first hardened by being transplanted to a coldframe they are able to stand a good deal of cold without injury.

Coldframes should be made in the fall so that they will be ready for spring work. It is sometimes well to have two or three coldframes in your garden especially in the north, as they will save your plants during the cold spells of spring.

In the middle of the day, when the air is warm, the glass or canvas above the frame may be raised. This gives the plants a better ventilation and at the same time hardens them. As night comes on the plants should be covered. Later on the frames may be kept open for a large part of the day, but only when the day is warm. Before the plants are taken up and planted in your garden the sashes should be kept off the frame for several days.

Vegetable seeds may be planted much sooner in coldframes than outside. Thus, tomatoes, cabbage, cauliflower, onions, etc., may be given an early start.

Leaf vegetables, such as lettuce, are better if grown entirely in a coldframe. They may be protected from frost, from too much heat, and from birds.

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OF

OHIO STATE UNIVERSITY

A Medium for Exchange of Ideas Between College and Farm

EDITORIALS

WELCOME

Welcome, three year men! The Agricultural Student welcomes every "short Ag" even more than in the ordinary way. Why? Because you have never had just representation in this publication. However this year marks the beginning of your advent into editorial work. J. V. Temple, a senior in the short course will edit the Short Ag. Department. Close cooperation of every man is the only insurance of your success. Your size, as to number, makes this more easily possible than with the larger group of four year men, even though your number will be swelled by the Federal Board students who will graduate next March, having doubled up the past year. Let every man help and then watch results!

COMING

Somewhere in each issue will be found a list of articles to be published in the near future. Of course, this does not include all the articles, but merely a general idea of the wide variety of important subjects available. It also will inform the reader what to expect and look forward to in the several coming issues.

SEMI-CENTENNIAL

As this issue goes to press, Ohio State is in the midst of a golden jubilee, marking the fifty year "milestone" of a most progressive existence. Alumni from almost every state in the union are swarming over the campus, meeting old friends and renewing old acquaintances. Loyal students are still on hand to welcome the old bunch back to our Alma Mater. As one observes the smiles of gladness on the happy faces of all these old "studes" and listens to the inspiring strains of Carmen as they peal forth from the Chimes of Orton Hall, who can blame us for our show of pride at the successful termination of the first lap of endeavor?

JOURNALISM

A course in Agricultural Journalism has been the object sought by fifty percent of the agricultural students. The petition with its five hundred signers has reached its goal, registering a strong impression. The principal barrier left is lack of "funds." This is no obstacle for those higher up to cope with. Nevertheless we have every reason to expect a course in Journalism for the second semester that will meet the requirements of the students in the college of Agriculture.

THANKSGIVING

In these days of luxurious living, the hunger for riches can be rightly termed lamentable. Tersely speaking, it is the struggle of the poor who have nothing, of the thrifty who have something, and of the wealthy who have much. The mere comforts of life are forgotten in this "eat drink and be merry contests for more. It is without a doubt a case of "buy more land to raise more corn, to feed more hogs, to buy more land, etc."

It is indeed pathetic to watch the struggle of the unfortunate in his endeavor to put bread upon the table, to clothe his children and educate them. At the same time there are those, whose selfish desires lead them to think of nothing else except the accumulation of more wealth, eventually trying to prolong their life, by finding the spring of perennial youth. This class is equally pathetic.

However, these two classes are not all. The man who works daily and is satisfied with the conditions of simple living, can look forward hopefully to the time that he will have achieved a competence, have educated his children, and provided for declining years. It is this class that is truly thankful for the substantial bounty of providence, displayed in the many large institutions of learning, hospitals for the care of the sick, establishments for scientific development, foundations for promoting the general welfare and the free libraries.

The man who is doing unessential work filling no useful purpose, or is doing necessary work in a totally wrong spirit, resentful, slacking, or wilfully hampering his job, is bound to lack in fibre. It is the reaction of the work in hand upon the individual which enlarges power and builds character.—*A. L. Haas in Impressions.*



PROBLEMS OF THE SOUTHERN PORK PRODUCER

(Continued from page 120)

sonally saw to it that good animals were always listed in their promotion sales. The Berkshire hogs were too small and refined to hold their own with the bigger typed animals that the other breeds sent down. However, there are some excellent Berkshires in the south eastern states at present. Duroc Jerseys once promised to sweep the south, but many very poor individuals came along with a few good ones and they did not hold the advantage that they gained at first. At present, popularity is about evenly divided between the Duroc Jerseys and the Poland Chinas. To date, the south does not have very many real constructive breeders and there is a real field for men who know blood lines and how they nick, as well as for men who know how to feed and develop the show winning kind. We do have a few breeders that are as good as can be found anywhere and their efforts have all been well rewarded. Most of our so-called breeders are speculators. They visit the north and buy up gilts and then bring them down and sell them. The demand has been tremendous so that this has been a very natural practice arising from such a condition. Most of the speculators have dealt in very creditable animals but a few have peddled some very trashy hogs to innocent buyers at good prices.

Some other problems I will only list as space will not permit discussion. Some of these are, the feeder pig question; hot weather conditions; tendency of pure-bred breeders to do a pig business; the selling of all pure bred animals for breeding stock, especially, many breeders do not use a good, sharp knife enough; difficulty in securing good breeding animals; lack of knowledge in feeding breeding stock; and a great

shortage of dependable labor as most negroes cannot be depended upon in feeding stock.

The south has been forced against her will to pay more attention to live stock than ever before. As a rule, cotton farmers have gone into the business in a whole-hearted sort of fashion with the idea in view of making the best of a real difficulty. Production will still increase for a few years and it is probable that it will then hold its own. Certainly a cotton alone system will never come back. It has been very pleasing to note that a few hogs have gone north from some of our breeders at good prices. There will be many more in the future. We hope that the awards at the next National Swine Show will demonstrate that there are some real breeders already in the south.

("Opportunity knocks but once." Is this your opportunity? Prof. Williams will be glad to correspond with those interested. "More power" to the worthy cause.—Ed.)

AG. ENGINEERING

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above the optimum a more than corresponding increase of horse power is required to do the work.

5. That the increased horsepower above that accounted for in increased speed results in an increase of the number of pounds per square inch of furrow.

6. This increase of pounds of effort per square inch of furrow slice is due to the inherent physical qualities of the soil, such as viscosity and friction speeds against the mouldboard, which have greater values at higher speeds.

7. That the increased effort per square inch of furrow slice varies from zero at optimum speed up to 25% at greatest speed and work is utilized in greater pulverization and reduction of the furrow ridge, and consequently is not entirely wasted.

VOCATIONAL AGRICULTURE

BOYS' AND GIRLS' CLUB WORK, ETC.

E. B. BARKER, Editor; J. A. MALICK, Assistant.

COMPETITIVE EXAMINATIONS

Through competitive agricultural examination the following won scholarship at Ohio State University:

Northwest District—Adrian Fleckert, Howard J. Tomlinson, Merritt Powell, Newell Ader.

Southeast District—Paul Teegar-den, James Webster, Walter Studor, Howard Forsyth, Webster Thomas.

Southwest District—Lester Baldwin, Fred C. Mathews, Benjamin Morris, Oddis H. Oliver, Dale Stoltz.

Northeast District—Clarence Gehrig, Walter L. Bluck, Max Koppes, Donald Eastman, John Sharick.

JUNIOR CLUB WEEK

Approximately 250 boys and 250 girls will attend Junior Club Week at Ohio State University November 15-19 inclusive. This number represents practically all county winners and some local and district winners in food, clothing, poultry, pig, beef, dairy, calf, corn, potato and garden club projects. Club members will arrive on November 15th, and leave Friday, November 19th. During the week a series of lectures and demonstrations on livestock, poultry, dress, and foods will be given. Talks by prominent men will be heard at the Chapel periods; setting up exercises and calisthenics will be featured, trips to points of interest will be made, and Dean Vivian will take the youngsters around the world with him in his illustrated lectures. As club week is scheduled at

a different time than Farmers' Week, it is evident there will be something doing all the time.

Dean Vivian was in attendance at the meeting of the American Association for advancement of agriculture teaching held at Springfield, Massachusetts, October 18-19.

It was found that 60% of premiums offered to high school boys at State Fair were taken by vocation students.

Paul Bemenderfer of Bloomville won highest honors and sweepstake prize at the State Fair, taking 1st in hogs, 2nd in horses and dairy cattle, and 3rd in beef cattle, for which he received \$55 in prizes.

M. L. Jordan is vocational teacher at Bloomville.

District conferences for vocational agriculture have been arranged to be held on the following dates and places: October 21 and 22, at Hamilton and Hilliard, to be attended by eleven visiting teachers; October 27 and 28 at Stricker and Fayette, to be attended by six teachers; November 4 and 5, Grove City and Worthington, to be attended by twelve visiting teachers; November 11 and 12, Ashland and Wooster, to be attended by seven visiting teachers; November 11 and 12, Bluffton and Wapakoneta, to be attended by seven visiting teachers; November 18 and 19, Bloomville and Green Spring, five visiting teachers; November 18 and 19, West Milton and

Brookville to be attended by seven visiting teachers.

These conferences will be under direction and supervision of the teacher training staff of department of agriculture education.

Vance Clever and George G. Everhart are going to do supervised teaching in Hamilton township and Worthington under the direction of Mr. Bruce and A. C. Kennedy. It is quite certain that Mr. Clever will teach in Hamilton, and G. G. Everhart at Worthington. Upon completion of their course at end of semester they will be qualified as teachers of vocational agriculture in two high schools where good teachers are most needed.

Other students who are preparing to qualify are enrolled in observation teaching are as follows: R. R. Rudell, J. F. Schickendantz, E. B. Barker, J. R. Mackmal, L. L. Geiger, Arthur New, and J. B. McClelland.

R. B. Tom, County Leader in Summit County announces a new club member by the name of Neva Mae in their home October 3rd.

Helen Greenlee, Mary Dixon, Edwin Bailey and Walter Mason, all of Belmont County composed the Boys' and Girls' Dairy Judging Team that represented Ohio at the National Dairy Show in Chicago in October. The team was coached by Ivan McKellip of the Dairy Extension Department and Guy Dowdy of the Club Department.

Mrs. F. M. Randolph of Perry County, Ohio, although a busy farm mother, still has time for the girls in her community. She has been local club leader of the "Bon Viande Food

Club" the past year and still is. The girls have made their group a regular club with live games, songs and yells with Mrs. Randolph back of them. Here is her favorite yell:

"Bon Viande, Bon Viande,
Some good grub
If you want Bon Viande
Boost our club."

DEVELOPMENT OF SOIL SCIENCE

(Continued from page 125)

of soil physics. In Florida, a narrow band of white quartz sand which is entirely destitute of plant food but extremely favorable in physical conditions and with the addition of large amounts of fertilizers is valued at \$400 to \$2500 per acre for the growing of pineapples. Other theories such as Humus, Mineral, Plagocytic, Soil Solution, Antagonisms between Ions and the Hydrogen Ion Concentration, can not be overlooked. And besides there are the "Points of View" of such men as Director Thorne, Cyril Hopkins, Dr. Whitney and Professor Bolley. So the question of soil fertility has been brought from the remote past through scientific research to the present, where it still seems to be in its beginning.

NO KICK AT ALL

I love my boarding house. The food is excellent. I have a lovely room. Everything is clean and comfortable. The furniture and fixtures are elegant and well selected. The atmosphere is refined and homelike. I like my surroundings so well that I remain at home every night. Everything about the place suits me great. You should see the landlady's daughter!—*Penn. Punch Bowl.*

FARM MANAGEMENT

RURAL LIFE, ETC.

B. P. HESS, Editor.

FALL PLOWING DESTROYS

MANY LAND INSECTS

By plowing in the fall, serious attacks of cutworms, web worms, wire worms, sod worms and bill bugs may be largely prevented, according to entomologists at the Ohio Experiment Station. On land that is level enough to prevent serious washing, fall plowing destroys many of these underground insects. Sod land of two or more years standing is almost sure to be infested with one or more of these pests, it is stated. Fall plowing may also relieve extreme labor conditions in the spring and crops may be planted earlier generally than when the land is plowed in the spring.

While grubs are disturbed by deep fall plowing because this insect comes near or below the plowed line during October.

Fall cultivation of alfalfa stubble helps to destroy webworms and insects peculiar to this legume. Many grasshopper eggs are also destroyed by fall cultivation.

GROWERS MERGE

Affiliation of the Vegetable Growers' Association of America with the American Farm Bureau Federation will be effected as the result of action taken by the vegetable men at their twelfth annual convention at Ohio State University. It was brought out that the association as such will continue to exist and exercise all its regular functions after the affiliation is accomplished. As suggested by Murray D. Lincoln, ex-

cutive secretary of the Ohio Farm Bureau Federation, the association and the federation will each appoint five members of a committee on plans.

"No law is needed to authorize collective bargaining, and no law can stop it," declared E. F. Bayard, Pittsburg, editor of *The National Stockman and Farmer*. "Collective bargaining is an inherent right."

"Conditions in the federal department of agriculture are deplorable," asserted Professor W. R. Beattie, Washington, an attache of the department. "Expert men are leaving the department daily, attracted by better salary opportunities elsewhere. Estimates of funds needed in projects of the department are pared down. It is difficult to keep a good man or to carry out the work because of this fact."

Following a committee report by F. C. Stokes, Moorestown, N. J., seedsmen, the association declared in favor of efforts to standardize varietal names of vegetables, and to buy of only those seedsmen who correctly name their varieties.

LAND BANKS

"The Federal Land Banks are financially stronger than at any time since their organization, and their net earnings for the month of July—\$275,000—were the largest for any month in their history"—was the statement made by the Federal Farm Loan Board. This statement was prompted by the suggestion that in some quarters an effort was being made to create the impression

that pending litigation which has temporarily suspended the loaning operations of the banks, was otherwise impairing the Farm Loan System. Commenting further, members of the board stated:

"To understand this readily, it should be borne in mind that the earnings of a Federal Loan Bank do not, like those of a commercial bank, depend upon their current transactions. The loans of the Federal Loan Banks are made for a long term of years—mostly 34½ years. On the unpaid balance of these loans each bank has an annual income of from one-half of one per cent to one per cent. This earning is fixed and certain regardless of new business. As the total amount of loans now in force is \$344,475,709, the extent and stability of this income can readily be seen. The increase in net income for July is explained by the fact that, while the fixed gross income was substantially the same, the several land banks, because of the halting in their loan operations, have reduced their operating expenses, thus increasing the net income. Dividends have been paid and will be paid as usual. Funds are accumulating for the payment of November interest, which will be paid promptly. So far as bondholders and stockholders are concerned, the banks are functioning normally. Persons wishing to avail them-

selves of the benefits of the system must, of course, for the time being be disappointed which is much regretted but can not be helped. While the banks have reduced their personnel and consequently their current expenses, this has not been done to a point that would interfere with the prompt resumption of their loan activities."

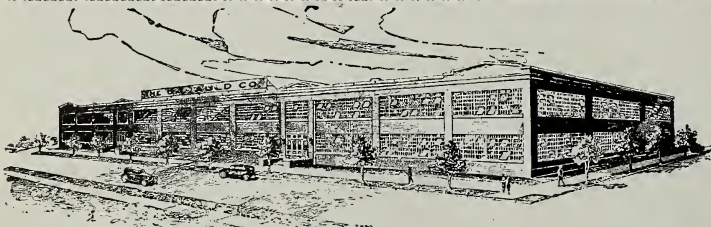
PREPARE HOTBEDS

(Continued from page 135)

In many of the northern states you can not grow plants in a hotbed or coldframe during winter unless more protection is given. This is sometimes done by placing straw or hay over the glass. Hay mats are very useful for this purpose.

If your garden does not have a hotbed for raising early plants, you should build one during October, when time can be given to it. Making a hotbed is not difficult, and gives you a fine opportunity to show how much of a carpenter you are. Every garden supervised by the school authorities should have a hotbed, and the building of this should be one of the earliest garden duties. If your bed is properly made in the fall, it will be in excellent condition for the next spring work.

In making your hotbed a pit is dug from two to three feet deep and from



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D. L. Auld
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Catalogue**

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FRATERNITY BADGES AND NOVELTY CLUB EMBLEMS, HIGH
SCHOOL PINS AND RINGS, ENGRAVED INVITATIONS.**



How to Feed for an Egg Harvest Now!

Grain feeds alone are not sufficient because they don't contain enough protein to make a white to go with each yolk developed. As yolks can't be laid without whites, a large number of them are not laid at all, but are absorbed back into the hen's system as fat when she is fed grain only. Corn, kafir, wheat and barley in equal parts contain material for 230 yolks and only 148 whites to the 100 lbs. of feed. Contrast that with Purina Chows:

	Yolks	Whites
50 lbs. of Purina Hen Chow contain	123	71
50 lbs. of Purina Chicken Chowder contain	91	141
100 lbs. of the combined ration, half and half, contain enough material for	214	212

This perfect balance shows clearly why the Purina Mills are able to guarantee

More Eggs or Money Back

"If hens fail to lay more eggs when fed Purina Chicken Chowder and Purina Hen Chow as directed, than when fed any other ration, the money paid for both these chows will be refunded." You can't lose, when you use Purina Chows. See your dealer or write us.

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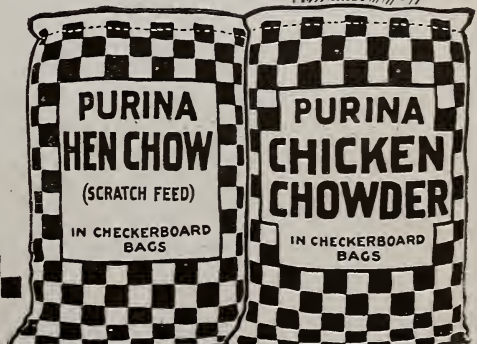
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One hundred pages of the most advanced ideas used by successful poultry raisers. Contains plans for homemade buildings and equipment, shows how to pick layers without the use of trap nests. Contains practical feeding charts, egg record blanks and scores of helpful suggestions.



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five to six feet wide. Glass sashes are used to cover the pit. These sashes are generally six feet long and three feet wide, but other sizes may be used if necessary. Make the pit long enough to fit the size of the sash chosen.

Place a 2-inch plank 12 to 15 inches wide on edge on the north side of the bed. Then on the south side of the pit place a plank about half the width of the one used on the north side. The sash, resting on these boards, will then slope toward the south, and you will get better results from the sunlight. The ends of the bed are closed with boards cut to fit snugly and soil is banked up all around the framework to keep out the cold. The pit should be dug and the framework arranged in the fall.

The sashes may be hinged at the top and held up by strong stick when the pit is opened, or they may be hinged on the side and thrown back when the pit is opened. Sometimes the sash are made to slide in and out on strips of wood set into the sides of the hotbed. The opening of the sashes is necessary to ventilate the bed properly and to allow you to work in the pit.

About 10 or 12 weeks before the time of outdoor planting the pit should be filled with well-heated stable manure. This manure is covered with six or eight inches of rich soil, finely powdered. Keep the soil moist while it is being heated by the fermenting manure. Keep a soil thermometer in the pit and carefully read the temperature from day to day. When the temperature falls to 90 or 85 degrees it is safe to sow your seeds. If the bed has been properly made, it will give out enough heat to grow plants during a period of five or six weeks.

SANITATION IN THE HOME

(Continued from page 131)

especially our mothers, have had much to do with keeping infectious diseases going. This has not been done consciously, and hence we are not blaming our mothers of the past. However women of today, through a knowledge of hygiene and sanitary measures, must take the responsibility of fighting the fight against disease.

Thus if Mrs. Jones' little boy, Tommie, has a headache, fever, and red spots are appearing on his tongue, will she send him to school? Tommie's little body is filled with measles germs and every child with whom he talks or plays is running a risk of getting some of those germs into his body. In a few days probably one half of the children in the room will be suffering with measles. Everyone will be asking how did it get a start? And maybe a few mothers will say, "I am glad Johnnie is having it now while he is small." Do they realize that one or more children of that group may die, or live with weakened eyes or lungs? Again do we realize that if every mother would take the precaution which Tommie's mother did not, that much could be accomplished toward the elimination of these common infections. If every mother could understand what this precaution would mean to the health and happiness of the children of our land, surely everyone would join the army to fight these troublesome and dangerous diseases.

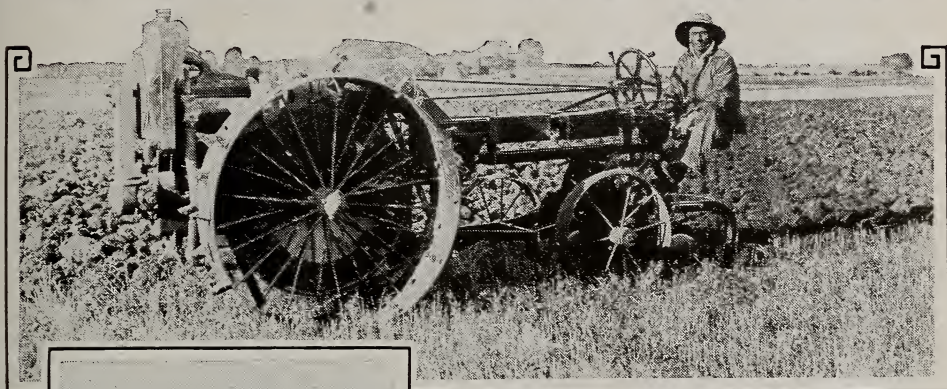
It is not too much to say therefore that in that great cornerstone of society, the home, sanitation needs the reinforcement of hygienic measures so that the family may be efficiently protected against disease.—Lillie Swanson, '21.

Some men have the same chance to "come back" that a bowlegged girl has to get married in her home town.

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The Universal Farm Power Plant

WINS AGAIN



The Moline is unique in the tractor field—made so by our patent protection.

LAST year Ben Davis, five times champion with horse-drawn plows, won the Wheatland Plowing Match in owners' class with a Moline Tractor.

Again this year the same team wins!

Ben Davis won sitting on the seat of his plow, where he could watch the work and make instant adjustments to meet varying soil conditions.

Mr. Davis is a great plowman, and the Moline a great farm unit. They made an unbeatable combination.

The Moline is now offered as a 3-2 Plow outfit.

3 Plows for ordinary conditions which prevail in most sections of the country.

2 Plows for extreme conditions and unfavorable seasons.

It is the correct farm power plant, doing all belt and field work, including cultivation, with one man.

If desired you can use the "Drag behind" or horse drawn implements you now have with the Moline Tractor the same as with other types of tractors.

See Your Moline Dealer or Write Our Nearest Branch at:

Moline
Atlanta
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MOLINE PLOW COMPANY, MOLINE, ILLINOIS

Beat the H. C. L.

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Cleaned, Pressed, Repaired and
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ber Heels while you wait.

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Likewise, less than car lots for
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Lead, Paris Green, Bordeaux Mix-
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SHOES

A NEW DEPARTMENT AND A NEW STOCK

EMERSON SHOES for College Men

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NEAR THE CAMPUS, OF COURSE

Natco Dairy Barns Are Warm in Winter

NATCO barns are warm in winter, yet cool in summer. They provide year-round comfort for your cows. More comfort in the stable means more milk in the pail—more money in the bank.

The hollow spaces in a glazed Natco Hollow Tile wall provide a blanket of still air through which heat, cold or dampness will not pass.

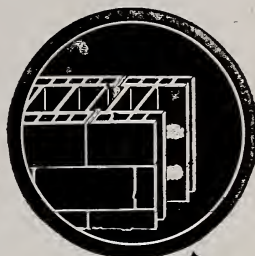
And the cost? Perhaps a little more at first, but *far less* in the end than for other construction. The saving in insurance and upkeep will repay the added investment within a few years. All further savings are clear profit.

Whatever you intend to build, our book, "Natco on the Farm," will offer helpful suggestions. Write for it today—*no charge*.

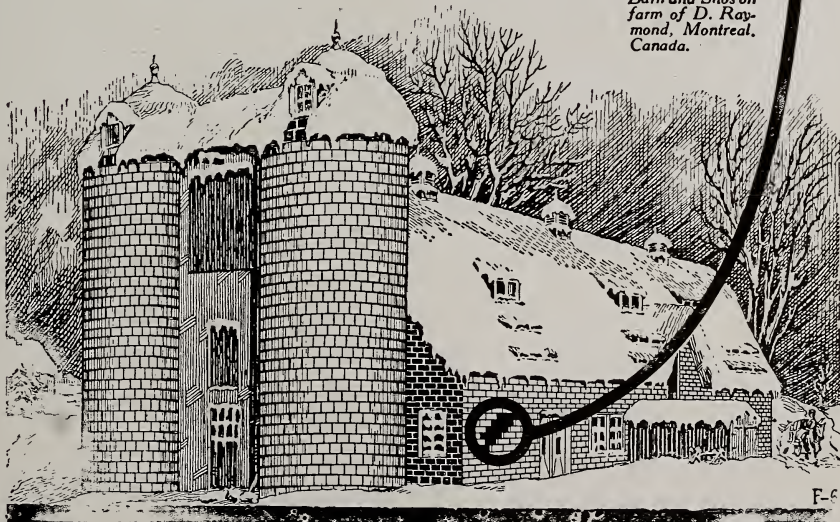
Ask your building supply dealer to quote you prices on Natco Hollow Tile.

National Fire Proofing Company
1132 Fulton Building
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23 Factories assure a wide and economical distribution.



Section of Natco Wall showing still air spaces.



Barn and Silos on farm of D. Raymond, Montreal, Canada.

CAMPUS ECHO

(Continued from page 133)

**UNIVERSITY EXTENSION
SERVICE PAMPHLETS**

Thirty circulars and ten bulletins were issued by the University agricultural extension service during the year 1919. These dealt with the most vital and most called for subjects in agriculture and home economics. The writers include extension specialists and members of the teaching staff of the University.

A. S. A. E. MEETS

Open meeting of the A. S. A. E. was addressed by Professor Thompson of the Agricultural Engineering Department. Following this was election of officers. L. D. Carey, Agriculture 4, Hicksville, Ohio, was elected vice-president; C. M. Becm, Agriculture 4, chairman of program committee and C. V. Kendall, Agriculture 4, chairman of the publicity committee. A big year is being planned.

Professor Wendell Paddock, department of Horticulture and Forestry, has been appointed chairman of exhibits for a fruit growers' show to be staged in Memorial Hall, Columbus, next December under the auspices of the Pomological Society of America, representing growers in United States and Canada. Professor Frederick Charles of the same department, will conduct the judging contest.

Dean Alfred Vivian, College of Agriculture, predicts adoption soon by agricultural colleges throughout the country of the plan dividing the school year into four quarters, with school during summer, enabling farmer boys to complete the equivalent of a four-year course in six years, by attending school only in the winter months.

DAIRY PRODUCTS**TEAM WINNERS**

Ohio State boys won the grand championship in the judging of dairy products at the National Dairy Show held at Chicago during the first week of October. The team was first in the judging of cheese and milk. Five out of the possible seven awards were given Ohio State.

Arthur H. Neu, Felicity, was champion and Talbott Armstrong, Columbus, third in the individual judging contest.

J. C. Regelsburger, Avon, and Harold G. Doster, South Euclid, were the other members of the team. This winning team was coached by Don S. Kochheiser of the university dairy department.

Plans are in the making for the largest agricultural open night in the history of the university. Every agricultural organization will be represented and you may rest assured that the Agriculturists will put on something worth while.

Professor Hoenig is organizing the student body for a real old-fashioned community sing. The Agriculturists will be on hand for the barnyard melody.

NEW TEXTS FOR AG. STUDENTS

Inability to find suitable texts for presenting agricultural subjects, has forced professors in several departments to come forward recently with texts of their own authorship. Two years ago Professor Rasor, of the department of mathematics, published in mimeograph form, his book on mathematics for students of agriculture. This book, which presents essential princi-

ples and appropriate problems which are needed in the scientific and practical work of the agricultural student, has been revised and is now in press. It will be ready for distribution in text-book form at the beginning of the second semester.

Facing the same problem in the department of agricultural chemistry, Professor Philips, with the aid of Dean Vivian, has compiled and has published in mimeograph form a text in simple organic chemistry. This text, which is based on Professor Philips' lecture of the past few years, is being revised and parts rewritten at the present time. It is hoped to have the book published in text-book form by next fall.

Professor Smith of the department of physics has also been forced to prepare a text on agricultural physics. This book of practical physics in its applications to agriculture is also in

mimeograph form at present but if plans do not go astray it too will appear in text form next year.

AGRICULTURAL CONDITIONS IN INDIA

On Friday, October eighth, students of the college of agriculture had the privilege of enjoying a lecture by Mr. B. C. Case, on "The Conditions of Agriculture in India." Mr. Case, who has spent years in missionary work in Burma an eastern province of India, gave reasons for the abject and general poverty of its inhabitants the following: 1—Low production. 2—Numerous animal enemies. 3—Disease, and 4—Debt. As methods of relief, he advocated religion, co-operative credit, and agricultural education. He concluded his address by an appeal to American agricultural students, as a duty to the world and to their country,

Ship Every Crop in the Universal Package



This standard bushel shipping container is equally adapted to every fruit or vegetable crop. Its great strength positively prevents injury from crushing. Its web is constructed so as to permit plenty of ventilation, making it an ideal package for storage purposes. Covers fasten without nails. Retailers prefer Universal Packages for display purposes, for their neat clean appearance makes ready sales at top prices. Over 10,000,000 were used last year.

Write for prices and name of nearest dealer TODAY.

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This Way to Higher Milk Production

"Letting well enough alone" never pays the highest dividends. Give your cows a feed that will produce more milk than the feed they are getting now and you gather greater profits without working any harder.



INTERNATIONAL SPECIAL DAIRY FEED Makes Milking Make More Money

This feed is guaranteed to produce more milk than any other feed of similar analysis. Feed International Special and watch milk production go up two or more quarts per cow each day. You must be satisfied that you are feeding this feed at a profit or we'll make good the difference to you. International Special Dairy Feed merits *etting* immediately from your dealer, or from us if your dealer hasn't it

INTERNATIONAL SUGAR FEED CO., Minneapolis, Minn.
Mills at Minneapolis and Memphis **LIVE AGENTS WANTED**



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ATHLETIC MEDALS and CUPS

**COLLEGE and FRATERNAL
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HIGH SCHOOL PINS

FOR GOOD THINGS TO EAT MARZETTI'S RESTAURANT

1548 N. High St.
59 East Gay St.

**STEAKS, CHOPS, CHICKEN,
ITALIAN DISHES, ETC.**

Special Dinner and Lunches

**ANYTHING SERVED
ANYTIME**

**Table Service—Reasonable Prices
Pleasant Surroundings
Cool Room**

WE SERVE ONLY THE BEST

The country seems to be experiencing a healthy and general readjustment of prices. Prices in many lines seem definitely to be coming down and the purchasing power of the dollar to be going up.

However, milk prices for October held closely to the September price, which was at a high level. The *October* milk price was about *30% higher* than the *May* price. Our price on BUFFALO CORN GLUTEN FEED *declined* some 35% since May.

In this general decline of prices, the feeder of BUFFALO CORN GLUTEN FEED has had a distinct advantage in the shape of our guarantees against decline in our price.

With these guarantees on BUFFALO CORN GLUTEN FEED, the dealer has been able to *rewrite his price* from time to time, and keep current with the declines; and the *dairy farmer*, who has bought this feed with the same *protection*, is able to mark down his costs in the same way.

A grain ration with a liberal proportion of BUFFALO CORN GLUTEN FEED can be made up—on account of these guarantees—at a much lower cost than with other concentrated feeds.

FEED UP!

to reduce your cost of production

Corn Products Refining Co.

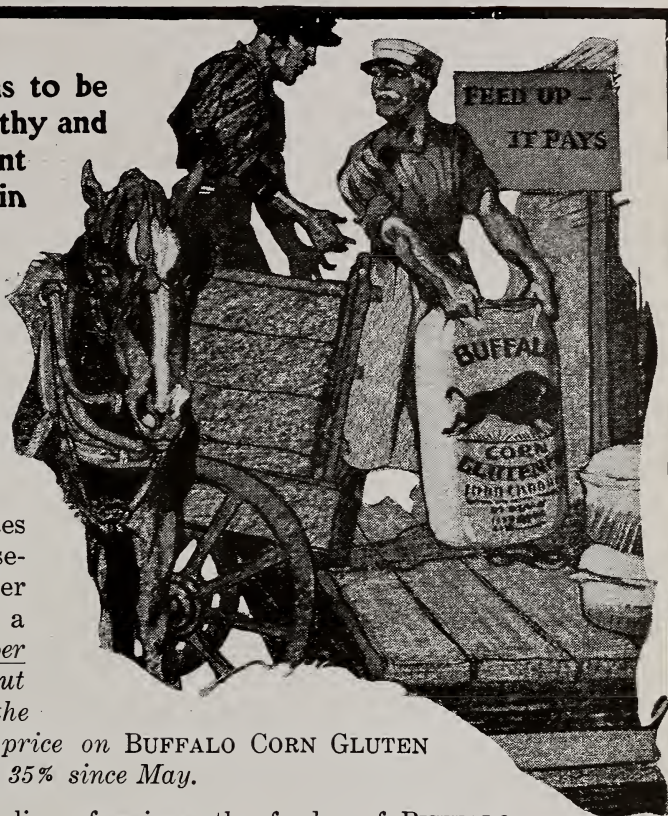
New York

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BUFFALO

Chicago

CORN
GLUTEN FEED

1004 Orange Street



to aid in solving the problem facing one hundred million starving people in Asia.

MISS DETMERS AT WOOSTER

Miss Freda Detmers, for many years a valued member of the faculty of the department of botany, is now connected with the department of plant pathology at the Wooster Agricultural Experiment Station. Miss Detmers has been engaged in this work during the summer months for several years.

Farmers who cry that they themselves are working to the limit and that they cannot get men to help them plant and harvest the essential crops forget that the movies and the cabarets have to be supported.

Warren McVey, '20, is teaching Animal Husbandry at Purdue.

ALUMNI

A. R. Tuttle, '16, is farming at Springfield, O.

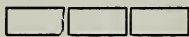
L. D. Carey, Ag. 4, is back to school with Lavera Countryman as his wife.

W. D. Cooper, '17, of Philippi, W. Va., is the county agent of Barbain Co.

George Kreitler, '20, is with the Rod-erick-Lean Co., of Mansfield, as advertising agent.

John Dowler has charge of the cost accounting circle in Green county, with headquarters in Jamestown, Ohio. His duties began July 1, 1920. With similar duties, H. C. Brunskill is employed in Medina county, with office at Medina. Mr. Brunskill assumes the position of Brant Early, '17, who resigned to become business manager of the Medina county farm bureau.

LEHMAN DRY CLEANER



OFFICE: TWELFTH AVE. AND HIGH

Plant: Opp. Olentangy Park.

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WE INSURE YOUR GARMENTS

Meet Me at

HENNICK'S TIFFIN SHOP

*Light Lunch
Cigars
Cigarettes*

The Finest Place of Its Kind
in the Country

POOL ROOM—BARBER SHOP

Dancing Every Evening

D. D. Hughes, '16, has resigned as farm accounts instructor and in his place F. N. Morrison, '16, (master's degree '17) has been employed. Mr. Hughes leaves to become connected with the Vaile-Kine people, water pump manufacturers of Dayton, Ohio.

Professor C. T. Conklin coached the Ohio State dairy judging team at the National Dairy show. The team consisted of George B. Ganyard, George W. Schrider, Philip E. Heim and David T. Herrman.

Professor D. J. Kays of the Animal Husbandry department judged the Belgian Horse show held at Waterloo, Iowa, which was held during the last week in September.

Prof. Erdman is with us again after a summer spent at the University of Wisconsin, receiving his Doctor's degree.

The model for a community house which was exhibited at the Ohio State Fair in 1919 has been sent to Cornell for exhibit at the New York State Fair this year. For exhibit along with the model was sent plans for community houses as well as plans for farm buildings.

Myron A. Bachtell, specialist in soils here for a number of years, becomes the new county agricultural agent for Wayne county. Mr. Bachtell is one of the first specialists employed by the College of Agriculture.

C. E. Wilson is the new assistant in the Extension Service. His duties as illustrator, chart maker and photographer cover an interesting and valuable field. E. K. Emslie, photographer for the past two years with the Extension Service, is now with the Buick Motor Co., Flint, Mich., as photographer.

Learn to Dance Before the Holiday Season

Prof. W. J. Rader's Academies of Dancing

NEIL AVE. ACADEMY, 647 Neil Ave.

Phones: Citz. 4431, Main 6189.

Take Neil Ave. car and get off at Poplar Ave.



Beginners' Classes organize Wednesday evening, November 10. Get the very first lesson.

Afternoon Beginners' Class Thursday, 2:30.

Private lessons afternoons or evenings.

Assembly Nights Monday, Thursday. Friday and Saturday, 8:15.

Advance Class, in the front hall, Monday evenings.

Tuition for beginners: Ladies, per term of 10 lessons, \$5.00; Gentlemen, \$6.00; Private Lessons, 5 lessons \$6.00.

Tuition can be paid \$1.00 a lesson until paid.

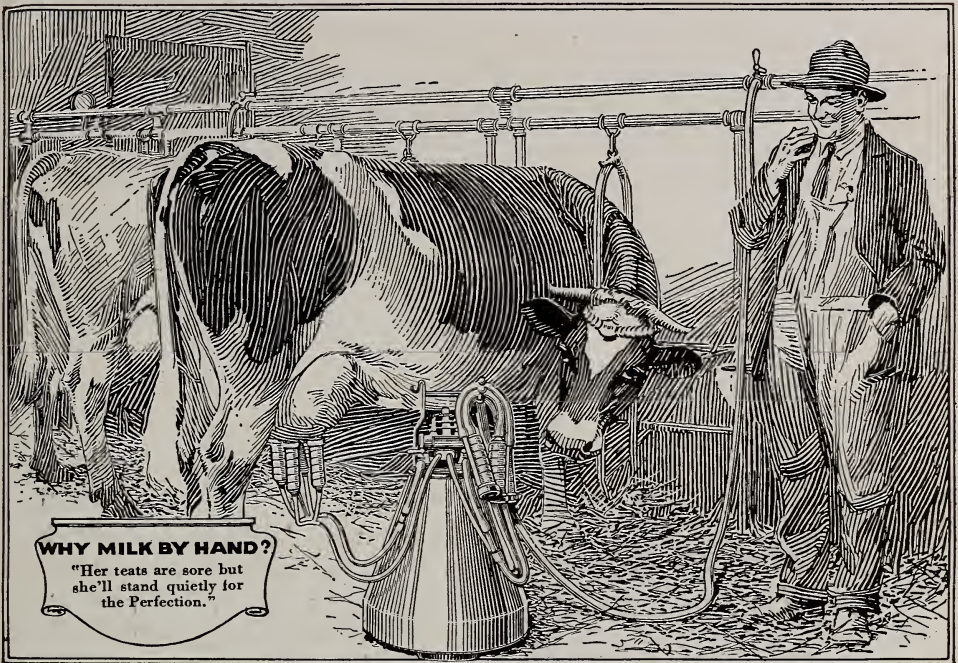
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The Waltz, Two-Step, Fox Trot and One-Step taught in one term. Go to the school that gives you thorough instruction.

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because it is just like the calf's, a gentle suction followed by a downward squeeze, followed by a period of rest. And the Perfection can be adjusted to either hard or easy milkers.

You too will prefer the Perfection. It does the work of three men. It soon pays for itself in saving of wages. Get a Perfection for your cows and see how much better they like it than hand milking.

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Send for a copy of our book "What the Dairyman Wants to Know." It's free. We shall also be glad to give you the names and addresses of Perfection owners near you. Why milk by hand? Cows prefer Perfection.

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**PERFECTION
MILKER**

S. B. Stowe, '08, of Marion, is now County Agent.

Ray Musgrave, '12, of Whorton, is farming at home.

R. C. Gauch, '15, is an insurance agent in Columbus.

W. S. Eckman, '14, is a landscape gardener in Columbus.

R. B. Dunn, '18, of Deshler, is teaching at Bowling Green.

H. A. Rose, '20, of Grafton, is farming at North Eaton, O.

Lee M. Oyler, '10, of Harrison, O., owns a fine farm in that vicinity.

Beryl Brenaman, '19, of Gahanna, O., is teaching Domestic Science.

P. B. Wiltberger, '15, of Columbus, is now studying medicine at O. S. U.

Agnes Moore, '19, of Columbus, is now engaged in Home Economics work.

J. E. Clawson, '08, resides in Columbus and is a graduate student at O. S. U.

O. E. Barker, '20, is doing splendid Smith-Hughes work at West Alexandria.

Ralph Richardson, '18, of St. Clairsville, O., is making a successful start in Smith-Hughes work.

S. R. Heffron, '17, is County Agricultural Agent and has his headquarters at London, O.

C. E. Vandersall, '00, of Burgoin, O., is farming and is also interested in a banking establishment.

George F. Johnson, '19, is living at Huntington, Ind., and is on the editorial staff of the *Indiana Farmers' Guide*.

Truman Tyler, '17, is managing a general farm near New Paris, O., and is experiencing wonderful success with registered Durocs.

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PURE, concentrated, ready to use, absolutely reliable. Giving uniformly best results in the country's finest creameries and cheese factories.

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What We Found Out

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The Quaker Oats Co.

Gentlemen—I must say to you frankly that in my letter to you concerning feeding of Holstein Friesian Cows on my Arden Farms, I overlooked the most important factor, which I wished to bring out. I do not believe in a high protein ration. After the experience I have had, it is my judgment that breeders do not place enough importance upon the maintenance part of the ration of a cow. To secure a maximum yearly production means that a cow must be kept in good physical condition, nothing must be done to tear down the structure. It is my judgment that too much protein is injurious. There is good chance for argument as to just how much protein a cow should have, but I do not wish to engage in a discussion of the fine points, but I believe that a small amount of protein is better than too much, if one expects to have cows go on year after year and maintain their good health and produce their maximum of butter and milk. We mix most of our feed ourselves with the exception of SCHUMACHER FEED and BIG "Q" DAIRY RATION, with which we have been very successful.

Yours very sincerely,

(Signed) J. M. HACKNEY.

ARDEN FARMS, St. Paul, Minn.

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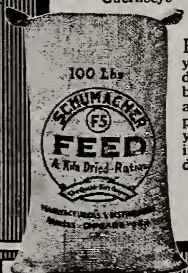
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(116-S)



Mary Merion, '17, of Columbus, is a Technician.

Walter H. Pomerene, '17, is farming at Logan, O.

W. W. Montgomery, '18, of Wartel, O., is a teacher.

C. R. Raymond, 19, is county agent of Athens county.

B. O. Stingel, '04, of Coshocton, is farming at home.

Ray S. Dietz, '19, is a Horticulturist and lives at Sugar Grove.

J. B. Markey, '16, of Eaton, O., is doing general farming at home.

Clarence M. Baker, '16, is an editor at the Ohio Experiment Station.

V. Fearn Reamer, '16, is living at Toledo and is now a Household Educator.

H. G. Knestrick, '19, of Grove City, O., is a teacher in Vocational Agriculture.

Marcella Payne, '17, residing at Columbus, is a director of Smith-Hughes work.

FARMERS AND BACKBONES

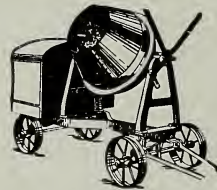
The political parties still realize that the farmers' vote is large enough to be worth considering. One party recognizes the farmer as the backbone of the nation. In the past there has been enough flesh on each side of the backbone to make it easy riding, but in the near future the rider must furnish a new saddle or he is going to find that the backbone is going to make more of an impression.

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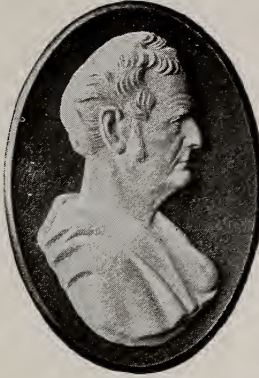
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